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10/542,359	07/14/2005	Shoichi Kikuchi	274618US0PCT	2815

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EXAMINER	
MCNELIS, KATHLEEN A	
ART UNIT	**PAPER NUMBER**
1742	

NOTIFICATION DATE	DELIVERY MODE
07/31/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/542,359	KIKUCHI ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claims Status

Claims 1-22 remain for examination wherein claims 1, 3 and 20 are amended.

Status of Previous Rejections

The following rejections are withdrawn in view of amendments to the claims and statements on p. 10 of the 05/09/2007 remarks that Tsuge et al. and Hoffman et al. were commonly owned at the time the invention was made:

- Claims 1-4 and 7-21 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5 and 9-16 of copending application 10/482,403, published as US 2004/0173054,
- Claims 1-22 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Kikuchi et al. (U.S. Pat. No. 6,592,649) or claims 3 and 13 of Kikuchi et al. (U.S. Pat. No. 6,210,462) or claims 23-25 of Meissner et al. U.S. Patent No. (6,413,295) or claim 1 of Ito et al. (U.S. Pat. No. 6,630,010) or claims 26 and 31 of Hoffman et al. (U.S. Pat. No. 6,749,664) or claims 1, 8-10 and 12 of Fuji et al. (U.S. Pat. No. 6,602,320) or claims 1 and 4 of Negami et al. (U.S. Pat. No. 6,036,744) or claims 4 and 5 of Negami et al. (U.S. Pat. No. 6,506,231) or claim 1 of or copending application 10/486,498 (published as US 2004/0211295) or claims 1, 7 and 8 of copending application 10/548,955 (published as US 2006/0169103) in view of WO 00/29628 (WO '628),
- Claims 1-7 and 9-22 under 35 U.S.C. 102(e) as being anticipated by Tsuge et al. (U.S. PG Pub. 2004/0173054),
- Claim 8 under 35 U.S.C. 103(a) as being obvious over Tsuge et al. (U.S. PG Pub. 2004/0173054),
- Claims 1-7, 10 and 11 under 35 U.S.C. 103(a) as being unpatentable over WO 99/20801 (WO '801),
- Claims 1-22 under 35 U.S.C. 103(a) as being unpatentable over WO 00/29628 (WO '628),

- Claims 1-4, 7 and 9-14 under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. Pat. No. 6,648,942).
- Claims 1-22 under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (U.S. Pat. No. 6,592,649) or Kikuchi et al. (U.S. Pat. No. 6,210,462) or Meissner et al. (U.S. Patent No. 6,413,295) or Ito et al. (U.S. Pat. No. 6,630,010) or Hoffman et al. (U.S. Pat. No. 6,749,664) or Fuji et al. (U.S. Pat. No. 6,602,320) or Negami et al. (U.S. Pat. No. 6,036,744) or Negami et al. (U.S. Pat. No. 6,506,231) or copending application 10/486,498 (published as US 2004/0211295) in view of WO 00/29628 (WO '628).

The following rejections are maintained:

- Claims 1-4, 7 and 9-14 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 15, 16, 18, 19, 26 and 28 of Hoffman et al. (U.S. Pat. No. 6,648,942).

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4, 7 and 9-14 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 15, 16, 18, 19, 26 and 28 of Hoffman et al. (U.S. Pat. No. 6,648,942).

Hoffman et al. is applied as discussed in the 02/09/2007 Office action.

Regarding the amended limitation to claims 1 and 3 that the reduced iron is removed at a second position downstream of a first position charging, such would have been obvious in view of Hoffman et al. claim 15, since discharge should occur after charging and treatment in order to heat and react the material.

Regarding the amended limitation to claims 1 and 3 that the hearth conditioning material be deposited at a location upstream of the charging of iron oxides, such would have been obvious in view of Hoffman et al. claim 15, which recites the step of distributing the hearth conditioning material as step a in the process whereas the iron is charged as step b.

Regarding the amended limitation to claims 1 and 3 that the leveling is performed between the charge of hearth conditioning material and iron containing material, Hoffman et al. claim 28 recites using a smoothing device to distribute the hearth conditioning material. It would be obvious to one of ordinary skill in the art to perform such smoothing after the hearth conditioning material is charged (i.e. downstream). Further, since the iron containing material is charged after (i.e. downstream) of the hearth conditioning material, a location between the hearth conditioning charge location and the iron containing material charge location is within the scope of Hoffman et al., and lacking evidence to the contrary, the selection of any order of performing process steps is prima facie obvious in the absence of any new or unexpected results (MPEP section 2144.04 IV, C).

Claims 1-10, 16, 17 and 19- 22 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Kikuchi et al. (U.S. Pat. No. 6,592,649) or claims 3 and 13 of Kikuchi et al. (U.S. Pat. No. 6,210,462) or claims 23-25 of Meissner et al. U.S. Patent No. (6,413,295) or claim 1 of Ito et al. (U.S. Pat. No. 6,630,010) or claims 26 and 31 of Hoffman et al. (U.S. Pat. No. 6,749,664) or claims 1, 8-10 and 12 of Fuji et al. (U.S. Pat. No. 6,602,320) or claims 1 and 4 of Negami et al. (U.S. Pat. No. 6,036,744) or claims 4 and 5 of Negami et al. (U.S. Pat. No. 6,506,231) or claim 1 of or copending application 10/486,498 (published as US 2004/0211295) or claims 1, 7 and 8 of copending application 10/548,955 (published as US 2006/0169103) in view of Sawa et al. (U.S. Pat. No. 6,126,718).

Although the conflicting claims are not identical, they are not patentably distinct from each other because:

With respect to instant claims 1 and 3:

- '649 claim 1 discloses a method for producing metallic iron by reducing an iron oxide material then melting to separate the iron from slag forming iron nuggets.
- '462 claim 3 discloses depositing a product release promotion layer on a hearth, then laying a mixture of powder containing iron oxide and a carbonaceous reducing agent, heating, reducing and melting to separate the metallic iron from slag. '462 claim 13 recites that the product release promotion layer is magnesia, calcia or alumina.
- Meissner et al. '295 claim 23 discloses a method for producing solid iron and carbon products from iron oxide by providing a sub-hearth surface layer, introducing conditioning materials including carbon and silica compounds, placing iron oxides and carbon on the layer, reducing and melting the iron, cooling and discharging. Claim 24 discloses that the furnace is a rotary hearth and claim 25 discloses that the conditioning materials are magnesium oxide, silicon oxide compounds, and carbon.

- '010 claim 1 discloses a method for heating iron oxide in a reduction melting furnace, reducing and melting the iron while separating the gangue and causing the molten metal to coalesce into granular metallic iron.
- '664 claim 26 discloses a method for producing solid iron from iron oxide and carbon compounds on a hearth surface by adding a plurality of layers of conditioning compounds onto the hearth surface, introducing a coating material onto the layers, adding carbon onto the top of the coating layer, reducing and melting the iron and discharging the solid iron from the furnace. Claim 31 discloses that the coating materials are graphite, charcoal, coal particles, fire clay and/or coke fines. The instant specification defines a "sintering accelerator" as any substance that develops the effect as a binder, and an example of kaolin (i.e. a clay), therefore the fire clay in '664 meets the limitation of a sintering accelerator. Since '664 discloses discharging the iron and carbon (i.e. coating layer) from the furnace (claim 26), one of ordinary skill in the art would expect that the coating would be replaced before adding more iron oxide material (i.e. repeat process starting with at least step (d)).
- '320 claim 1 discloses a method for producing reduced iron by charging agglomerates of iron oxide containing material into a furnace and reducing to produce reduced iron. Claims 8 and 9 disclose first charging a carbonaceous powder to the hearth of the furnace. Claim 10 discloses that the furnace is a rotary hearth. Claim 12 discloses a further sep of melting the metallic iron and coagulating the molten metallic iron.
- '744 claim 1 discloses a method for producing metallic iron by heating iron oxide and a carbonaceous reducing agent, reducing and separating the metallic iron from the slag. Claim 4 discloses that at least part of the iron is melted.
- '231 claim 4 disclose a method of producing metallic iron by charging iron oxide and a carbonaceous reducing agent into a thermal reduction apparatus, reducing the mixture and melting at least part of the iron, therefore the apparatus is a reduction melting

furnace. '231 discloses chilling the metallic iron (claim 4 step G). '231 claim 5 discloses that the heating is preformed while apparatus is moving in a horizontal direction.

- Kikuchi et al. '295 claim 1 discloses producing metallic iron by heating, reducing and melting iron-oxide with carbonaceous reductant in a reduction melting furnace of moving hearth type. This is a provisional rejection.
- '103 claim 1 discloses a method of manufacturing granulated metallic iron from a raw material containing an iron oxide and a carbonaceous reducing agent in a rotary hearth type furnace were the iron oxide is reduce, coalesced and separated from resultant slag followed by cooling of the metallic iron to solidify. Since the iron must be cooled to solidify, one of ordinary skill in the art would expect that it was at least partially melted. Claim 7 discloses spreading a carbonaceous powder on the hearth prior to supplying the raw material mixture. Claim 8 discloses that the layer is 2 mm or more.

Introducing the charge material to be reduced at a first location then discharging at a second location downstream of the charging location would have been obvious to one of ordinary skill in the art at the time the invention was made in the processes claimed by Kikuchi et al. '649 '462 or Meissner et al. '295 or Ito et al. '010 or Hoffman et al. '664 or Fuji et al. '320 or Negami et al. '744 or '231 or copending application 10/486,498 or 10/548,955, since treatment in the furnace is desired.

'649 or '462 or '010 or '664 or '320 or '744 or Kikuchi et al. '295 does not claim forming a renewable hearth layer capable of being renewed, cooling the metallic iron ore renewing a part or whole of the hearth after removing the hearth and leveling the surface, or forming the renewable hearth at a third position upstream of the first position in the direction of movement and leveling between the first and third positions.

Meissner et al. '295 or '231 or '103 does not claim renewing a part or whole of the hearth after removing the hearth and leveling the surface, or forming the renewable hearth at a third position upstream of the first position in the direction of movement and leveling between the first and third positions.

Sawa et al. discloses a method for producing reduced metal by charging a raw material containing a metal containing material and a solid reducing material on a layer of solid reducing material placed on the hearth of a traveling hearth furnace, reducing and melting the material to separate metal from gangue and discharging from the hearth (abstract). Sawa et al. discloses reducing, melting and cooling the raw material (col. 3 lines 4-35). Sawa et al. discloses forming a solid reducing material layer on the hearth such that the raw material including iron oxides is charged onto the layer of solid reducing material (col. 3) where the solid reducing material provides reductant to prevent reoxidation of the iron (col. 6 lines 40-67) and protects the hearth from direct contact with the molten metal which prevents erosion of the hearth (col. 7 lines 13-15). Sawa et al. discloses an embodiment where the solid reducing material layer is discharged at least partially or entirely (col. 14 lines 46-58). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a carbonaceous hearth layer as taught by Sawa et al. in the process of '649 or '462 or '010 or '664 or '320 or '744 or Kikuchi et al. '295 to prevent reoxidation of the iron and protect the hearth from contact with the molten metal, thus preventing erosion of the hearth as taught by Sawa et al.

Sawa et al. teaches that the reduced/melted iron is more easily separated from slag by the creation of concave portions in the surface of the solid reducing material layer (cols 9-10) and discloses the use of a roller (14-3) as a means for providing such surface, where the roller is between the charging location for the solid reducing material and the raw material feed (Figure

15). The roller would provide leveling of the solid reducing material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the roller device as taught by Sawa et al. in the process of '649 or '462 or '010 or '664 or '320 or '744 or Kikuchi et al. '295 or Meissner et al. '295 or '231 or '103 to provide a surface beneficial for separation of reduced iron from slag as taught by Sawa et al.

Claim 2 does not recite any process steps and therefore does not further limit claim 1. Since Sawa et al. discloses performing essentially the same process with essentially the same materials, hearth degradation would occur in essentially the same manner.

With respect to claims 4 and 7, the feeding mechanism (14-1) in Sawa et al., being extended across the surface of the hearth would be expected to fill recesses formed on the surface of the hearth as well as to adjust the thickness. Further, Sawa et al. discloses controlling the thickness (e.g. Figs. 5(a) and 6(a)).

With respect to claim 5, the roller (14-3) in Sawa et al. is positioned across the direction of hearth movement (Figure 15) and therefore intersects the moving direction of the hearth.

With respect to claim 6, Sawa et al. Figure 7 shows that the discharge mechanism is in a direction intersecting the moving direction of the hearth therefore iron and slag are discharged in the moving direction concomitant with the moving.

With respect to claim 8, Sawa et al. discloses an embodiment where the solid reducing material layer is discharged at least partially or entirely (col. 14 lines 46-58). In this embodiment, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide continuous feed of solid reducing material to replace the removed layer. Such would be fed simultaneously with the leveling of already leveled material.

With respect to claims 9 and 10, Sawa et al. discloses carbonaceous material as the solid reducing material (col. 7 line 61 – col. 8 line 8) and discloses coal chars, coke, non-coking coals, coking coals and anthracite as specific examples (col. 11 lines 42-62), where coal chars, coke, non-coking coals, coking coals and anthracite are high melting point materials having corrosion resistance to the produced slag.

With respect to claim 16, the heat treatment provided by the furnace would be expected to soften the hearth material.

With respect to claim 17, Sawa et al. discloses a powder coke as an example of the solid reducing material (col. 9 line 64 – col. 10 line 16).

With respect to claim 19, the carbonaceous material is an atmosphere adjusting agent. In examples, Sawa et al. discloses non-coking coal and coal char (cols. 15-18) where the volatile matter would be expected to adjust the atmosphere.

With respect to claim 20, Sawa et al. discloses adding a carbonaceous material as the solid reducing material as discussed above regarding claims 1 and 3, and also with the raw material mixture of metal containing material and solid reducing material (abstract).

With respect to claim 21, Sawa et al. discloses an embodiment wherein a carbonaceous layer is overlaid with a flux layer (col. 11 lines 42 – 62).

With respect to claim 22, the roller mechanism (14-3) disclosed by Sawa et al. would be expected to compact the surface.

Claims 11-14 and 18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 3 and 13 of Kikuchi et al. (U.S. Pat. No. 6,210,462) or claims 23-25 of Meissner et al. U.S. Patent No. (6,413,295) or claims 26 and 31 of Hoffman et al.

(U.S. Pat. No. 6,749,664) in view of Sawa et al. (U.S. Pat. No. 6,126,718) as applied to claims 1 and 3.

Kikuchi et al. '462 or Meissner et al. '295 or Hoffman et al . '664 in view of Sawa et al. is applied as discussed above regarding claims 1 and 3.

Further, Kikuchi et al. '462 claim 13 or Meissner et al. '295 claim 25 or Hoffman et al. '664 claim 31 discloses the addition of MgO and/or CaO and/or alumina and/or silica onto the hearth.

Claim Rejections - 35 USC § 102

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 9, 10, 16, 17 and 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Sawa et al. (U.S. Pat. No. 6,126,718).

With respect to claims 1 and 3, Sawa et al. discloses a method for producing reduced metal by charging a raw material containing a metal containing material and a solid reducing material on a layer of solid reducing material placed on the hearth of a traveling hearth furnace, reducing and melting the material to separate metal from gangue and discharging from the hearth (abstract). Sawa et al. discloses iron ore as a reducible material (col. 6 lines 40-47). Sawa et al. discloses reducing, melting and cooling the raw material (col. 3 lines 4-35). Figure 7 shows a generalized layout of the furnace comprising charging device (14) preheating zone (10a), reducing zone (10b), melting zone (10c), cooling zone (10d), cooler (17) and discharging device (15). Figure 15 shows a detailed view of the charging device comprising charging device of solid reducing material (14-

2), charging device of raw material (14-2) and roller (14-3). Since the direction of travel is from the charging device through preheating, reducing, melting and cooling prior to discharge, the position of the discharged device (15) is downstream of the charging device (14) with respect to the direction of travel of the hearth (col. 6 lines 47-57 and Figure 7). Since the solid reducing material (1) is place as a lower layer between the raw material mixture containing iron ore (Fig. 2), the charging device for solid reducing material (14-2) is upstream of charging device for raw material (14-2) and the roller (14-3) is between the two (Figure 15) in the direction of flow of the hearth.

Sawa et al. discloses an embodiment where the solid reducing material layer is discharged at least partially or entirely (col. 14 lines 46-58). The roller (14-3) in Sawa et al. would level the surface of the newly formed hearth.

Claim 2 does not recite any process steps and therefore does not further limit claim 1. Since Sawa et al. discloses performing essentially the same process with essentially the same materials, hearth degradation would occur in essentially the same manner.

FIG. 7

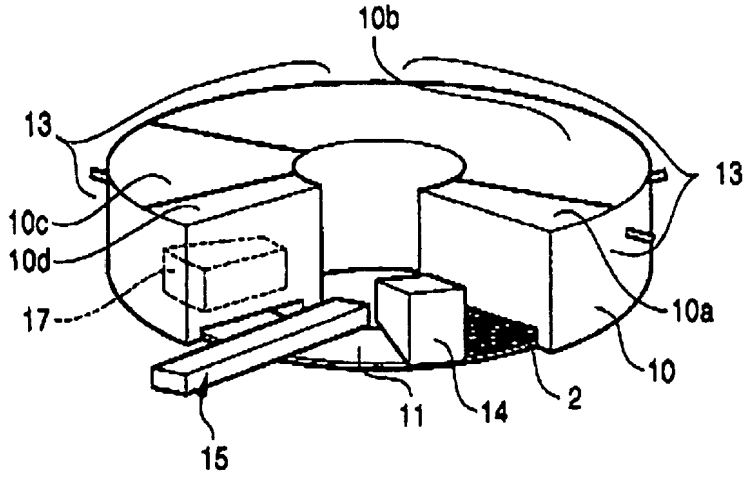
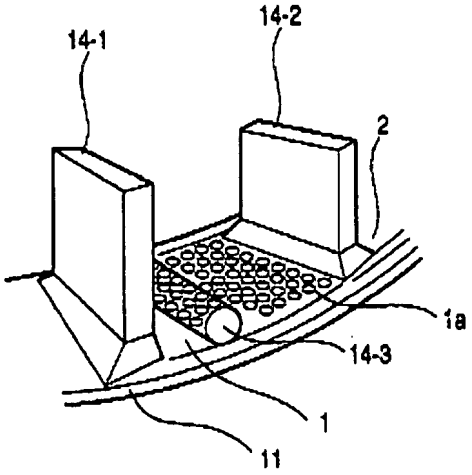


FIG. 15



With respect to claims 4 and 7, the feeding mechanism (14-1) being extended across the surface of the hearth would be expected to fill recesses formed on the surface of the hearth as well as to adjust the thickness. Further, Sawa et al. discloses controlling the thickness (e.g. Figs. 5(a) and 6(a)).

With respect to claim 5, the roller (14-3) is positioned across the direction of hearth movement (Figure 15) and therefore intersects the moving direction of the hearth.

With respect to claim 6, Figure 7 shows that the discharge mechanism is in a direction intersecting the moving direction of the hearth therefore iron and slag are discharged in the moving direction concomitant with the moving.

With respect to claims 9 and 10, Sawa et al. discloses carbonaceous material as the solid reducing material (col. 7 line 61 – col. 8 line 8) and discloses coal chars, coke, non-coking coals, coking coals and anthracite as specific examples (col. 11 lines 42-62), where coal chars, coke, non-coking coals, coking coals and anthracite are high melting point materials having corrosion resistance to the produced slag.

With respect to claim 16, the heat treatment provided by the furnace would be expected to soften the hearth material.

With respect to claim 17, Sawa et al. discloses a powder coke as an example of the solid reducing material (col. 9 line 64 – col. 10 line 16).

With respect to claim 19, the carbonaceous material is an atmosphere adjusting agent. In examples, Sawa et al. discloses non-coking coal and coal char (cols. 15-18) where the volatile matter would be expected to adjust the atmosphere.

With respect to claim 20, Sawa et al. discloses adding a carbonaceous material as the solid reducing material as discussed above regarding claims 1 and 3, and also with the raw material mixture of metal containing material and solid reducing material (abstract).

With respect to claim 21, Sawa et al. discloses an embodiment wherein a carbonaceous layer is overlaid with a flux layer (col. 11 lines 42 – 62).

With respect to claim 22, the roller mechanism (14-3) would be expected to compact the surface.

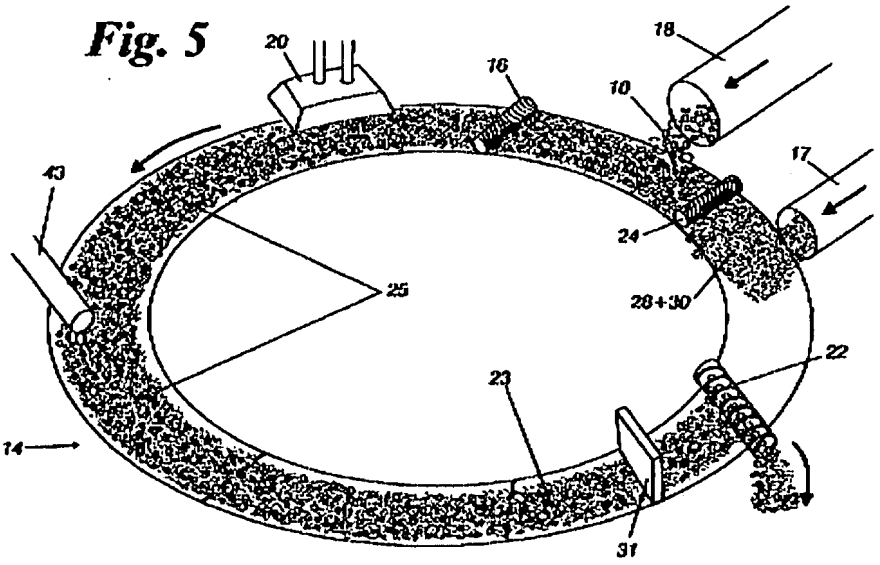
Claims 1-14 and 16-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Hoffman et al. (U.S. Pat. No. 6,648,942).

Regarding claims 1 and 3, Hoffman et al. discloses a method for producing metallic iron from pre-reduced metallized iron on a finisher hearth melter where the refractory surface of the hearth is coated with carbonaceous hearth conditioning agents and refractory compounds. Residual iron oxide is reduced and the resulting iron is heated until molten, cooled then discharged with the hearth conditioners and refractory compounds from the hearth (abstract).

Figure 5 shows a schematic representation of the process where a mixture of refractory compounds (30) and carbonaceous materials such as graphite, anthracite coal, petroleum coke and

coke breeze (29) and refractory compounds such as silica, alumina and magnesia (30) are discharged from a position (17) which is upstream of the location for charging the pre-reduced metallized iron (10). A smoothing device (24), preferably an auger-screw device is located between the charge location of the carbonaceous and refractory compounds and the pre-reduced iron. The metallized iron, carbonaceous and refractory materials are removed by discharge device (22) (cols 5-8). The smoothing device levels the material.

Fig. 5



Claim 2 does not recite any process steps and therefore does not further limit claim 1. Since Hoffman et al. discloses performing essentially the same process with essentially the same materials, hearth degradation would occur in essentially the same manner.

With respect to claims 4 and 7, the smoothing device (24) being extended across the surface of the hearth would be expected to fill recesses formed on the surface of the hearth as well as to adjust the thickness.

With respect to claim 5, the smoothing device (24) is positioned across the direction of hearth movement (Figure 5) and therefore intersects the moving direction of the hearth.

With respect to claim 6, Figure 5 shows that the discharge mechanism is in a direction intersecting the moving direction of the hearth therefore iron and slag are discharged in the moving direction concomitant with the moving.

With respect to claim 8 Hoffman et al. discloses continuous addition of hearth material and smoothing (cols. 5-8 and Fig. 5).

With respect to claims 9 and 10, Hoffman et al. discloses carbonaceous material such as graphite, anthracite coal, petroleum coke and coke breeze as discussed above regarding claims 1 and 3 where graphite, anthracite coal, petroleum coke and coke breeze are high melting point materials having corrosion resistance to the produced slag.

With respect to claims 11-14 and 18, Hoffman et al. discloses carbonaceous materials, CaO, alumina, MgO and silica (col. 5 lines 1-42), where silica is a sintering promoter.

With respect to claim 16, the heat treatment provided by the furnace would be expected to soften the hearth material.

With respect to claim 17, Hoffman et al. discloses coke breeze (i.e. coke fines) as discussed above regarding claims 1 and 3.

With respect to claim 19, the carbonaceous material is an atmosphere adjusting agent.

With respect to claim 20, Hoffman et al. discloses adding a carbonaceous material as the solid reducing material as discussed above regarding claims 1 and 3, and also with the raw material mixture of metal containing material and solid reducing material (abstract).

With respect to claim 21, Hoffman et al. discloses an embodiment wherein a carbonaceous layer is overlaid with a flux layer (col. 11 lines 42 – 62).

With respect to claim 22, the smoothing device (24) would be expected to compact the surface.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sawa et al. (U.S. Pat. No. 6,126,718).

Sawa et al. is applied as discussed above regarding claims 1 and 3.

Sawa et al. discloses an embodiment where the solid reducing material layer is discharged at least partially or entirely (col. 14 lines 46-58). In this embodiment, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide continuous feed of solid reducing material to replace the removed layer. Such would be fed simultaneously with the leveling of already leveled material.

Claims 10-15, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawa et al. (U.S. Pat. No. 6,126,718) in view of WO 00/29628 (WO '628).

Sawa et al. is applied as discussed above regarding claims 1 and 3.

With respect to claims 10-13 and 18, Sawa et al. discloses the addition of a flux to the solid reducing layer to reduce the quantity of slag in the molten metal (col. 11 lines 42-62), but does not specifically recite the use of alumina or magnesia.

WO '628 discloses the addition of a protective layer on the hearth of a rotary furnace where examples of such protective layer are carbon, magnesium and aluminum oxides (abstract and p. 9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add magnesia and/or alumina as taught by WO '628 to the solid reducing layer of Sawa et al. since WO '628 teaches the addition of such in the same field of endeavor and both alumina and magnesia are known by those skilled in the art to be fluxes as desired in Sawa et al.

With respect to claim 14, Sawa et al. does not disclose the addition of a sintering accelerator.

WO '628 discloses the addition of a protective layer on the hearth of a rotary furnace where examples of such protective layer are carbon, silica, magnesium and aluminum oxides (abstract and p. 9). Silica is therefore recognized in the art as equivalent to carbon used for the same purpose, therefore combining silica as taught by WO '628 with the carbonaceous material in Sawa et al. would have been obvious to one of ordinary skill in the art (See M.P.E.P. 2144.06).

With respect to claim 15, Sawa et al. discloses a cooling zone as discussed above regarding claims 1 and 3, but is silent regarding the means of providing cooling and therefore does not disclose the use of a coolant.

WO '628 discloses cooling by plate (48) having cooling liquid (i.e. coolant) flowing internally (p. 10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a cooling plate with cooling liquid as taught by WO '628 in the cooling zone of Sawa et al. since cooling is desired in Sawa et al.

Claims 1-10, 16, 17 and 19- 22 are rejected are rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (U.S. Pat. No. 6,592,649) or Kikuchi et al. (U.S. Pat. No. 6,210,462) or Meissner et al. (U.S. Patent No. 6,413,295) or Ito et al. (U.S. Pat. No.

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6,630,010) or Hoffman et al. (U.S. Pat. No. 6,749,664) or Fuji et al. (U.S. Pat. No. 6,602,320) or Negami et al. (U.S. Pat. No. 6,036,744) or Negami et al. (U.S. Pat. No. 6,506,231) or copending application 10/486,498 (published as US 2004/0211295) in view of Sawa et al. (U.S. Pat No. 6,126,718).

Kikuchi et al. '649 or '462 or Meissner et al. or Ito et al. or Hoffman et al. or Fuji et al. or Negami et al. '744 or '231 or Kikuchi et al. '295 in view of Sawa et al. is applied as discussed above regarding the ground of nonstatutory obviousness-type double patenting.

Claims 11-14 and 18 are rejected are rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (U.S. Pat. No. 6,210,462) or Meissner et al. (U.S. Patent No. 6,413,295) or Hoffman et al. (U.S. Pat. No. 6,749,664) in view of Sawa et al. (U.S. Pat No. 6,126,718).

Kikuchi et al. '462 or Meissner et al. or Hoffman et al. in view of Sawa et al. is applied as discussed above regarding the ground of nonstatutory obviousness-type double patenting.

Response to Arguments

Applicant's arguments with respect to withdrawn rejection grounds have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 05/09/207 regarding maintained rejections have been fully considered but they are not persuasive.

Applicant has argued that Hoffman et al. claim 28 does not recite the presently claimed upstream location for the leveling step. Examiner has addresses this new limitation above in the grounds of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571 272 3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAM
07/22/2007

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